

Claims

I claim:

1. A sideframe pedestal to axle bearing interface assembly for a three piece rail road car truck, said interface assembly having fittings operable to rock both laterally and longitudinally.
2. The sideframe pedestal to axle bearing interface assembly of claim 1 wherein said assembly includes mating surfaces of compound curvature, the compound curvature including curvature in both lateral and horizontal directions.
3. The sideframe pedestal to axle bearing interface assembly of claim 1 wherein said assembly includes at least one rocker element and a mating element, the rocker and mating elements being in point contact with a mating element, said element in point contact being movable in rolling point contact with said mating element.
4. The sideframe pedestal to axle bearing interface assembly of claim 3 wherein said element in point contact is movable in rolling point contact with said mating element both laterally and longitudinally.
5. The sideframe pedestal to axle bearing interface assembly of claim 1 wherein said fittings include rockingly matable saddle surfaces.
6. The sideframe pedestal to axle bearing interface assembly of claim 1 wherein said fittings include a male surface having a first compound curvature and a mating female surface having a second compound curvature in rocking engagement with each other, and one of said surfaces includes at least a spherical portion.
7. The sideframe pedestal to axle bearing interface assembly of claim 1 wherein said fittings include a non-rocking central portion in at least one direction.
8. The sideframe pedestal to axle bearing interface assembly of claim 1 wherein, relative to a vertical axis of rotation, rocking motion of said fittings longitudinally is torsionally de-coupled from rocking of said fittings laterally.
9. The sideframe pedestal to axle bearing interface assembly of claim 1 wherein said fittings include a force transfer interface that is torsionally compliant relative to torsional moments about a vertical axis.

10. The sideframe pedestal to axle bearing interface assembly of claim 1 wherein said assembly includes an elastomeric member.
11. A swing motion three piece rail road car truck having a laterally extending truck bolster, a pair of longitudinally extending sideframes to which the truck bolster is resiliently mounted, and wheelsets to which the side frames are mounted, damper groups mounted between the bolster and each of the sideframes, the damper groups each having a four-cornered damper layout, and wheelset to sideframe pedestal interface assemblies operable to permit lateral swinging motion of the sideframes and longitudinal self-steering of the wheelsets.
12. A three piece rail road car truck having a truck bolster mounted between sideframes, and wheelsets to which the sideframes are mounted, and wheelset to sideframe interface assemblies by which to mount said sideframes to said wheelsets, said sideframe to wheelset interface assemblies including rocking apparatus to permit said sideframes to swing laterally, said rocking apparatus including first and second surfaces in rocking engagement, at least a portion of said first surface having a first radius of curvature of less than 30 inches, and said sideframe to wheelset interface including self steering apparatus.
13. The three piece rail road car truck of claim 12 wherein said self steering apparatus has a substantially linear force deflection characteristic.
14. The three piece rail road car truck of claim 12 wherein said self steering apparatus has a force-deflection characteristic that varies with vertical loading of said sideframe to wheelset interface assembly.
15. The three piece rail road car truck of claim 14 wherein said force-deflection characteristic varies linearly with vertical loading of said sideframe to wheelset interface assembly.
16. The three piece rail road car truck of claim 12 wherein said self steering apparatus includes a rocking element.
17. The three piece rail road car truck of claim 16 wherein said rocking element includes a rocking member subject to angular displacement about an axis transverse to one of said sideframes.

18. The three piece rail road car truck of claim 16 wherein said self steering apparatus includes male and female rocking elements, and at least a portion of said male rocking element has a radius of curvature of less than 40 inches.
19. The three piece rail road car truck of claim 16 wherein said self steering apparatus includes male and female rocking elements, and at least a portion of said female rocking element has a radius of curvature of less than 60 inches.
20. The three piece rail road car truck of claim 16 wherein said self steering apparatus is self centering.
21. The three piece rail road car truck of claim 16 wherein said self steering apparatus is biased toward a central position.
22. The three piece rail road car truck of claim 12 wherein said self steering apparatus includes a resilient member.
23. The three piece rail road car truck of claim 22 wherein said resilient member includes an elastomeric element.
24. The three piece rail road car truck of claims 22 wherein said resilient member is an elastomeric adapter pad assembly.
25. The three piece rail road car truck of claim 24 wherein said resilient member is an elastomeric adapter assembly having a lateral force-displacement characteristic and a longitudinal force-displacement characteristic, and said longitudinal force-displacement characteristic is different from said lateral force-displacement characteristic.
26. The three piece rail road car truck of claim 25 wherein said elastomeric adapter assembly is stiffer in lateral shear than in longitudinal shear.
27. The three piece rail road car truck of claim 24 wherein a rocker element is mounted above said elastomeric adapter pad assembly.
28. The three piece rail road car truck of claim 24 wherein a rocker element is mounted directly upon said elastomeric adapter pad assembly.

29. The three piece rail road car truck of claim 24 wherein said elastomeric adapter pad assembly includes and integral rocker member.
30. The three piece rail road car truck of claim 12 wherein said three piece truck is a swing motion truck and said self steering apparatus includes an elastomeric bearing adapter pad.
31. The three piece rail road car truck of claim 12 wherein said wheelsets have axles, and said axles have axes of rotation, and ends mounted beneath said sideframes, and, at one end of one of said axles, said self steering apparatus has a force deflection characteristic of at least one of the characteristics chosen from the set of force-deflection characteristic consisting of
 - (a) a linear characteristic between 3000 lbs per inch and 10,000 pounds per inch of longitudinal deflection measured at said axis of rotation at said end of said axle when said self steering apparatus bears one quarter of a vertical load of between 45,000 and 70,000 lbs.;
 - (b) a linear characteristic between 16,000 lbs per inch and 40,000 pounds per inch of longitudinal deflection measured at said axis of rotation at said end of said axle when said self steering apparatus bears one quarter of a vertical load of between 263,000 and 315,000 lbs.; and
 - (c) a linear characteristic between 0.20 and 0.75 lbs per inch of longitudinal deflection measured at said axis of rotation at said end of said axle per pound of vertical load passed into said one end of said one axle.
32. A three piece rail road freight car truck having self steering apparatus, wherein said self steering apparatus includes at least one longitudinal rocker.
33. A three piece rail road freight car truck having passive self steering apparatus, said self steering apparatus having a linear force-deflection characteristic, and said force-deflection characteristic varying as a function of vertical loading of said truck.
34. The three piece rail road freight car truck of claim 33 wherein said force-displacement characteristic varies linearly with vertical loading of said truck.
35. The three piece rail road freight car truck of claim 33 wherein said self steering apparatus includes a rocker mechanism.

36. The three piece rail road car truck of claim 35 wherein said rocker mechanism is displaceable from a minimum energy state under drag force applied to a wheel of one of said wheelsets.
37. The three piece rail road freight car truck of claim 33 wherein said force-deflection characteristic lies in the range of between about 0.2 lbs and 0.75 lbs per inch of deflection measured at a center of and end of an axle of a wheelset of said truck per pound of vertical load passed into said end of said axle of said wheelset.
38. The three piece rail road freight car truck of claim 37 wherein said force deflection characteristic lies in the range of 0.27 to 0.41 lbs per inch per pound of vertical load passed into said end of said axle of said wheelset.
39. A three piece rail road freight car truck having a transversely extending truck bolster, a pair of side frames mounted at opposite ends of said truck bolster, and resiliently connected thereto, and wheelsets, said sideframes being mounted to said wheelsets at sideframe to wheelset interface assemblies, at least one of said sideframe to wheelset interface assemblies being mounted between a first end of an axle of one of said wheelsets, and a first pedestal of a first of said sideframes, said wheelset to sideframe interface assembly including a first line contact rocker apparatus operable to permit lateral swinging of said first sideframe and a second line contact rocker apparatus operable to permit longitudinal displacement of said first end of said axle relative to said first sideframe.
40. The three piece rail road freight car truck of claim 39 wherein said first and second rocker apparatus are mounted in series with a torsionally compliant member, said torsionally compliant member being compliant to torsional moments applied about a vertical axis.
41. The three piece rail road freight car truck of claim 40 wherein a torsionally compliant member is mounted between said first and second rocker apparatus, said torsionally compliant member being torsionally compliant about a vertical axis.
42. A bearing adapter for a three piece rail road freight car truck, said bearing adapter having a rocking contact surface for rocking engagement with a mating surface of a sideframe pedestal fitting, said rocking contact surface of said bearing adapter having a compound curvature.
43. The bearing adapter of claim 42 wherein said compound curvature is formed on a first

male radius of curvature and a second male radius of curvature oriented cross-wise thereto.

44. The bearing adapter of claim 42 wherein said compound curvature is saddle shaped.
45. The bearing adapter of claim 42 wherein said compound curvature is ellipsoidal.
46. The bearing adapter of claim 42 wherein said compound curvature is spherical.
47. A three piece railroad car truck having a laterally extending truck bolster, said truck bolster having first and second ends; first and second longitudinally extending sideframes resiliently mounted at said first and second ends of said bolster respectively; and said side frames being mounted on wheelsets at sideframe to wheelset mounting interface assemblies; a four cornered damper group being mounted between each end of said truck bolster and the respective side frame to which that end is mounted; and said sideframe to wheelset mounting interface assemblies being torsionally compliant about a vertical axis.
48. The three piece rail road car truck of claim 47 wherein said truck is free of unsprung lateral cross-members between said sideframes.
49. The three piece rail road car truck of claim 47 wherein said sideframes are mounted to swing laterally.
50. The three piece rail road car truck of claim 49 wherein said sideframe to wheelset mounting interface assemblies include self steering apparatus.

RAIL ROAD CAR TRUCK WITH BEARING ADAPTER

Abstract of the Disclosure

A rail road freight car truck is provided that has a truck bolster and a pair of side frames, the truck bolster being mounted transversely relative to the side frames. The mounting interface between the ends of the axles and the sideframe pedestals allows lateral rocking motion of the sideframes in the manner of a swing motion truck. The lateral swinging motion is combined with a longitudinal self steering capability, either from the use of a lateral rocker in combination with an elastomeric bearing adapter pad, or by use of a longitudinally oriented rocker that may tend to permit resistance to self steering that is proportional to the weight carried across the interface.